APPELLANT'S BRIEF (37 C.F.R § 1.192)
Attorney Docket No.: MD0-2471-U-D1

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Rhonda Goodloe
Print Name of Depositor
Date: July 10, 2003

IN THE UNITED STATES

PATENT AND TRADEMARK OFFICE

Confirmation #	2221
Applicant:	MUKHOPADHYAY, Debasish
Serial No.:	09/243,237
Filed:	02/02/99
Title:	HIGH PURITY WATER PRODUCED BY REVERSE OSMOSIS
Art Unit:	1723
Examiner:	Fortuna, A.

ATTENTION: BOARD OF APPEALS AND INTERFERENCES
COMMISSIONER FOR PATENTS
ALEXANDRIA, VA 22313-1450

APPELLANT'S BRIEF
(37 C.F.R. § 1.192)

This brief is in furtherance of the Notice of Appeal, filed in this case on December 10, 2002.

The fees required under § 1.17, and any required petition for extension of time for filing this brief and fees therefor, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

The brief is transmitted in triplicate.

The brief contains these items under the following headings, and in the order set forth below (37 C.F.R. § 1.192(c)):

I. REAL PARTY INTEREST
II. RELATED APPEALS AND INTERFERENCES
III. STATUS OF CLAIMS
IV. STATUS OF AMENDMENTS
V. SUMMARY OF INVENTION
VI. ISSUES
VII. GROUPING OF CLAIMS
VIII. ARGUMENTS
IX. APPENDIX OF CLAIMS

Check each category of ARGUMENT submitted in this brief:

☐ ARGUMENT: VIIIA
REJECTIONS UNDER 35 U.S.C. 112, FIRST PARAGRAPH

☐ ARGUMENT: VIIIB
REJECTIONS UNDER 35 U.S.C. 112, SECOND PARAGRAPH

☐ ARGUMENT: VIIIC
REJECTIONS UNDER 35 U.S.C. 102

☐ ARGUMENT: VIIID
REJECTIONS UNDER 35 U.S.C. 103

☐ ARGUMENT: VIIIE
REJECTIONS OTHER THAN 35 U.S.C. 102, 103 AND 112

IX. APPENDIX OF CLAIMS INVOLVED IN THE APPEAL

☐ OTHER MATERIALS THAT APPELLANT CONSIDERS NECESSARY OR DESIRABLE

The final page of this brief bears the practitioner's signature.

I. REAL PARTY IN INTEREST (37 C.F.R. § 1.192(c)(1))

The real party in interest in this appeal is:

☒ the party named in the caption of this brief.

☐ the following party:

II. RELATED APPEALS AND INTERFERENCES (37 C.F.R. § 1.192(c)(2))

With respect to other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal:

☒ there are no such appeals or interferences.
☐ these are as follows:

III. STATUS OF CLAIMS
(37 C.F.R. § 1.192(c)(3))

The status of the claims in this application are:

A. TOTAL NUMBER OF CLAIMS IN APPLICATION

Claims in the application are: 37-62.

B. STATUS OF ALL THE CLAIMS

1. Claims cancelled: 1-10, 11-36
2. Claims withdrawn from consideration but not cancelled: none
3. Claims pending: 37-62
4. Claims allowed: none
5. Claims rejected: 37-62

C. CLAIMS ON APPEAL

The claims on appeal are: **CLAIMS 37-62**

IV. STATUS OF AMENDMENTS (37 C.F.R. § 1.192(c)(4))

(1) Preliminary Amendment

By Preliminary Amendment mailed February 2, 1999, claims 93-98 were amended and new claims 122-125 were added.

(2) Rejection of claims 1-10

Claims 122-125 and claims 93-98 were renumbered 1-4 and 5-10 respectively by Examiner's Amendment dated October 6, 1999. By Official Action mailed October 6, 1999, the examiner rejected presented claims 1-10.

(3) Amendment and Response

By Amendment mailed April 6, 2000, claims 1-10 were cancelled and newly presented claims 11-36 were added.

(4) Rejection of Claims 11-36

By Official Action mailed July 14, 2000, the examiner rejected claims 11-36.

(5) Amendment and Response

By Amendment mailed January 16, 2001, arguments were presented and reconsideration and withdrawal of all rejections and objections were requested. No claims were amended. No claims were cancelled. No claims were added.

(6) Final Rejection of Claims 11-36

By Official Action mailed April 10, 2001, the examiner rejected claims 11-36.

(7) Continued Prosecution Application

A Continued Prosecution Application was mailed October 9, 2001. Claims 11-36 remained pending. No claims were amended. No claims were cancelled. No claims were added.

(8) Final Rejection of Claims 11-36

By Final Official Action mailed October 24, 2001, the examiner rejected claims 11-36.

(9) Request for Continued Examination (RCE)

A Request for Continued Examination (RCE) was mailed April 24, 2002. By Amendment mailed April 24, 2002, claims 11-36 were cancelled and newly presented claims 37-62 were added.

(10) Final Rejection of Claims 37-62

By Final Official Action mailed June 11, 2002 the examiner finally rejected claims 37-62.

(11) Notice of Appeal

A Notice of Appeal was filed on December 10, 2003 in response to the rejected claims 37-62.

V. SUMMARY OF INVENTION (37 C.F.R. § 1.192(c)(5))

This invention involves a valuable water product which is produced by a unique process. In one embodiment, the product is an ultrapure water composition that has been economically and thus advantageously manufactured in membrane separation equipment by way of processing an available feedwater through such equipment via a novel process flow scheme. Thus, the pending claims are directed at a composition of matter which results from such processing of an available feedwater.

Since available feedwaters which require treatment to produce a purified water stream for a desired use vary widely in chemical composition, and since the specifications for purified water streams vary widely, the unique product produced by the process set forth in the claims of this application will vary widely, especially in view of differing starting water compositions. However, the product produced by the process set forth in the claims of this application, when compared with the product produced by the processes set forth in the cited references, or otherwise, will be of differing composition, as will be further described herein below.

More specifically, independent claim 37 describes a composition of water and dissolved solutes that is produced by a process of treatment of a feedwater stream in membrane separation equipment, wherein the membrane separation equipment comprises at least one unit having a membrane separator, and wherein said process of treatment produces a low solute containing product water stream and a high solute containing reject stream. The process for producing the claimed water composition comprises:

(a) providing a feedwater stream containing solutes therein, said solutes comprising

(i) hardness,

(ii) alkalinity, and

(iii) at least one molecular species which is sparingly ionized when in neutral or near neutral pH aqueous solution;

(b) concentrating the feedwater stream in a first unit of membrane separation equipment after reducing the tendency of the feedwater to form scale when the feedwater is concentrated to a preselected concentration factor at a selected pH, by effecting, in any order, two or more of the following:

(i) removing hardness from the feedwater stream;

(ii) removing substantially all alkalinity associated with hardness from the feedwater stream;

(iii)removing dissolved gas from the feedwater stream, whether initially present or created during the hardness removal or the alkalinity removal step;

(c) raising the pH of the product from step (a) to a selected pH of at least about 8.5, to urge at least one molecular species which is sparingly ionized when in neutral or near neutral pH aqueous solution toward increased ionization;

(d) passing the product from step (c) above through the membrane separation equipment, where the membrane separation equipment substantially resists passage of dissolved species therethrough, and where the membrane rejects the at least one molecular species which is sparingly ionized when in neutral or near neutral pH aqueous solution by at least 95% while concentrating the selected feedwater to a preselected concentration factor, to produce

(i) a high solute containing reject stream, and
(ii) a low solute containing water product stream.

It is the low solute containing water product stream that is claimed herein.

Claim 38 is similar to claim 37, but in step (b)(ii), substantially all non-hydroxide alkalinity associated with hardness in the feedwater is removed.

In claim 39, the feedwater stream is specified to further contain at least some Total Organic Carbon, and the composition of water resulting from the process has less than one percent of the Total Organic Carbon in the feedwater stream.

Claim 40 is directed to a water composition produced according to the process of claim 39, wherein the Total Organic Carbon in the product water stream is less than 0.4% of the Total Organic Carbon in the feedwater stream.

Claim 41 is directed to a composition of water and dissolved solutes produced according to the process of claim 39, wherein the Total Organic Carbon in the product water stream is less than 0.34% of the Total Organic Carbon in the feedwater stream.

Claim 42 is directed to a composition of water and dissolved solutes produced according to the process of claim 37, wherein the feedwater stream further comprises boron, and wherein (a) the product water stream is characterized by having a boron content of less than about two percent (2%) of the boron content of said the stream; and (b) wherein the feedwater stream comprises at least some Total Organic

Carbon, and wherein the product water stream comprises at least some Total Organic Carbon, and wherein the Total Organic Carbon in the product water product stream is less than one percent of the Total Organic Carbon in the feedwater stream.

Claim 43 is directed to a composition of water and dissolved solutes produced according to the process of claim 37, wherein (a) the feedwater stream further comprises boron, and wherein the product water stream is characterized by having a boron content of about one and one-half percent (1.5%), or less, of the boron content of the feedwater stream; and (b) the feedwater stream comprises at least some Total Organic Carbon, and wherein the product water stream comprises at least some Total Organic Carbon, and wherein the Total Organic Carbon in the product water product stream is less than one percent of the Total Organic Carbon in the feedwater stream.

Claim 44 is directed to a composition of water and dissolved solutes produced according to the process of claim 37, wherein (a) the feedwater stream further comprises boron, and wherein the product water stream is characterized by having a boron content of about one percent (1%), or less, of the boron content of the feedwater stream; and (b) wherein the feedwater stream comprises at least some Total Organic Carbon, and wherein the product water stream comprises at least some Total Organic Carbon, and wherein the Total Organic Carbon in the product water product stream is less than one percent of the Total Organic Carbon in the feedwater stream.

Claim 45 is directed to a composition of water and dissolved solutes manufactured according to the process of

claim 42, wherein the Total Organic Carbon in the product water stream is less than 0.4% of the Total Organic Carbon in the feedwater stream.

Claim 46 is directed to a composition of water and dissolved solutes manufactured according to the process of claim 43, wherein the Total Organic Carbon in the product water stream is less than 0.4% of the Total Organic Carbon in the feedwater stream.

Claim 47 is directed to a composition of water and dissolved solutes produced according to the process of claim 44, wherein the Total Organic Carbon in the product water stream is less than 0.4% of the Total Organic Carbon in the feedwater stream.

Claim 48 is directed to a composition of water and dissolved solutes produced according to the process of claim 42, wherein the Total Organic Carbon in the product water stream is less than 0.34% of the Total Organic Carbon in the feedwater stream.

Claim 49 is directed to a composition of water and dissolved solutes produced according to the process of claim 43, wherein the Total Organic Carbon in the product water stream is less than 0.34% of the Total Organic Carbon in the feedwater stream.

Claim 50 is directed to a composition of water and dissolved solute produced according to the process of claim 44, wherein the Total Organic Carbon in the product water stream is less than 0.34% of the Total Organic Carbon in the feedwater stream.

Claim 51 is directed to a composition of water and dissolved solutes produced according to the process of claim 37, wherein the feedwater stream further comprises silica, and wherein the product water stream is characterized by having a silica content of less than about 0.05% of the silica content of the feedwater stream.

Claim 52 is directed to a composition of water and dissolved solutes produced according to the process of claim 42, wherein the feedwater stream further comprises silica, and wherein the product water stream is characterized by having a silica content of less than about 0.05% of the silica content of the feedwater stream.

Claim 53 is directed to a composition of water and dissolved solutes produced according to the process of claim 43, wherein the feedwater stream further comprises silica, and wherein the product water stream is characterized by having a silica content of less than about 0.05% of the silica content of the feedwater stream.

Claim 54 is directed to a composition of water and dissolved solutes produced according to the process of claim 44, wherein the feedwater stream further comprises silica, and wherein the product water stream is characterized by having a silica content of less than about 0.05% of the silica content of the feedwater stream.

Claim 55 is directed to a composition of water and dissolved solutes produced according to the process of claim 37, wherein the feedwater stream further comprises bacteria, and wherein the product water stream is characterized by having essentially zero bacteria content.

Claim 56 is directed to a composition of water and dissolved solutes produced according to the process of claim 42, wherein the feedwater stream further comprises bacteria, and wherein the product water stream is characterized by having essentially zero bacteria content.

Claim 57 is directed to a composition of water and dissolved solutes produced according to the process of claim 43, wherein the feedwater stream further comprises bacteria, and wherein the product water stream is characterized by having essentially zero bacteria content.

Claim 58 is directed to a composition of water and dissolved solutes produced according to the process of claim 44, wherein the feedwater stream further comprises bacteria, and wherein the product water stream is characterized by having essentially zero bacteria content.

Claim 59 is directed to a composition of water and dissolved solutes produced according to the process of claim 37, wherein the feedwater stream further comprises live viruses, and wherein the product water stream is characterized by having essentially zero live viruses therein.

Claim 60 is directed to a composition of water and dissolved solutes produced according to the process of claim 42, wherein the feedwater stream further comprises live viruses, and wherein the product water stream is characterized by having essentially zero live viruses therein.

Claim 61 is directed to a composition of water and dissolved solutes produced according to the process of claim

43, wherein the feedwater stream further comprises live viruses, and wherein the product water stream is characterized by having essentially zero live viruses therein.

Claim 62 is directed to a composition of water and dissolved solutes produced according to the process of claim 44, wherein the feedwater stream further comprises live viruses, and wherein the product water stream is characterized by having essentially zero live viruses therein.

VI. ISSUES
(37 C.F.R. § 1.192(c)(6))

(A) Whether or not claims 37-41, 44, 55, and 56 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Collentro (U.S. Patent Nos. 5,766,479 and 5,670,053).

(B) Whether or not claims 37-62 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Bhave, et al (5,645,727)

(C) Whether or not claims 37-42 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Abe, et al (5,573,662)

(D) Whether or not claims 37-54 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Tao, et al (5,250,185)

VII. GROUPING OF CLAIMS (37 C.F.R. § 1.192(c)(7))

Independent claim 37 and independent claim 38 include novel features which are separately patentable.

Claims dependent on independent claim 37 also each include novel features which, in combination with their respective parent and, if applicable, intermediate claims, are separately patentable.

VIIA - ARGUMENTS
REJECTIONS UNDER 35 U.S.C. § 112, FIRST PARAGRAPH
(37 C.F.R. § 1.192(c)(8)(i))

NOT APPLICABLE

VIIB - ARGUMENTS
REJECTIONS UNDER 35 U.S.C. § 112, SECOND PARAGRAPH
(37 C.F.R. § 1.192(c)(8)(ii))

NOT APPLICABLE

VIIC - ARGUMENTS
REJECTIONS UNDER 35 U.S.C. § 102
(37 C.F.R. § 1.192(c)(8)(iii))

NOT APPLICABLE

VIID - ARGUMENTS

REJECTIONS UNDER 35 U.S.C. § 103

(37 C.F.R. § 1.192(c)(8)(iv))

1. First, the examiner rejected pending claims 37-41, 41 (sic), 55, and 56 under 35 U.S.C. § 103(a) as being obvious over "Caloundra et al" (sic), actually Collentro et al, U.S. Patent Nos. 5,766,479 and 5,670,053. Unfortunately, the Collentro process requires pre-treatment via activated carbon and nano-filtration to remove organic matter. Moreover, rather than accomplish the water treatment process in a "first unit" of "membrane separation equipment" as set forth in independent claim 37 or independent claim 38 of the instant invention, it is clear by reference to the figure of the '053 Collentro et al patent that the Collentro process requires multiple membrane separation steps to accomplish the removal of undesirable compounds from the feedwater stream. The Collentro method thus has an additional process step which results in increased cost when compared to treating a feedwater in a single membrane process step. See the single figure of Collentro '053 or FIGS. 1 and 2 of the '479 patent.

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. Fundamentally, the prior art patent used by the examiner as this basis for the rejection does not result in the presently claimed invention. All of the words in a claim must be considered in judging the patentability of that claim against the prior art. The teaching or suggestion to make the claimed combination must be found in the prior art. In the Collentro patents, neither teach nor suggest the provision of a product water

stream which has, for example as set forth in claim 39 or claim 44 of less than one percent of the TOC of the feedwater stream, or less than 0.4% of the TOC of the feedwater stream as set forth in claim 40, or less than 0.34% of the TOC of the feedwater stream as set forth in claim 41. More specifically, Collentro does not teach the production of a high quality water product from a first unit of membrane equipment. The test is not whether the differences would have been obvious, but whether the claimed invention as a whole would have been obvious. See MPEP Section 2142. Since the prior art reference does not teach or suggest all of the claim limitations, as presented, it is respectfully submitted that a prima facia case of obviousness has not been made out by the examiner. Consequently, it is respectfully requested that this basis of rejection be reversed.

2. Next, the examiner rejected pending claims 37-62 under 35 U.S.C. § 103(a) as being obvious over Bhave, et al (5,645,727). Yet, Bhave et al is simply a particulate filtration system which takes a used ultrapure water that has been contaminated with particulates, and removes most of such particulates, while using ozone to reduce or eliminate biological growth. The Bhave et al system is a cross-flow filtration, not a membrane separation system.

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. Fundamentally, this prior art patent used by the examiner as a basis for the rejection does not result in the presently claimed invention. All of the words in a claim must be considered in judging the patentability of that claim against the prior art. The teaching or suggestion to make the claimed combination must be found in the prior art. Bhave et al neither teaches or suggests the production of a composition of water via processing water having hardness, alkalinity, and a sparingly ionized species in a first unit of membrane equipment. The test is not whether the differences would have been obvious, but whether the claimed invention as a whole would have been obvious. See MPEP Section 2142. Since the prior art reference does not teach or suggest all of the claim limitations, as now presented, it is respectfully submitted that a prima facia case of obviousness has not been made out by the examiner. Consequently, it is respectfully requested that this basis of rejection be reversed.

3. Next, the examiner rejected pending claims 37-42 under 35 U.S.C. § 103(a) as being obvious (unpatentable) over Abe, et al (U.S. Patent No. 5,573,662). The examiner argues that Abe et al discloses the product water with the level of TOC as in the product of the claimed invention. The examiner has cited col. 3, line 53 as showing that the Abe et al produces water as set forth and claimed herein. However, a careful reading of that part of the Abe patent reveals that the cited reference is to the concentration of TOC in the water to be treated by the Abe et al process, not the concentration of the TOC in the resultant effluent. Further, contrary to the examiner's assertion, removal of other components cannot be assured or assumed by one of ordinary skill in the art, absent any mention of proper pH adjustment to assure rejection of sparingly ionized species.

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. Fundamentally, the prior art patent used by the examiner as a basis for the rejection does not result in the presently claimed invention. All of the words in a claim must be considered in judging the patentability of that claim against the prior art. The teaching or suggestion to make the claimed combination must be found in the prior art. The test is not whether the differences would have been obvious, but whether the claimed invention as a whole would have been obvious. See MPEP Section 2142. Since the prior art reference does not teach or suggest all of the claim limitations, as presented, or suggest the claimed result, it is respectfully submitted that a prima facia case of obviousness has not been made out by the examiner. Consequently, it is respectfully requested that this basis of rejection be reversed.

4. Finally, the examiner rejected pending claims 37-54 under 35 U.S.C. § 103(a) as being obvious (unpatentable) over Tao, et al (U.S. Patent No. 5,250,185). The examiner argues that Tao discloses a product water containing 1.2% of boron, and argues that it would have been obvious to one skilled in the art to produce water with the same quality by treating the water at the same pH as suggested by the Tao reference. Unfortunately, the examiner has neglected to address the fact that one of ordinary skill in the art would realize that such a pH of operation would not be feasible in the Tao process, since Tao fails to teach the necessity of removal of alkalinity to a level sufficient to avoid scaling due to the solubility product of hardness and alkalinity, as thoroughly explained in the instant patent application.

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. Fundamentally, the Tao patent used by the examiner as a basis for the rejection does not result in the presently claimed invention. All of the words in a claim must be considered in judging the patentability of that claim against the prior art. The teaching or suggestion to make the claimed combination must be found in the prior art. The test is not whether the differences would have been obvious, but whether the claimed invention as a whole would have been obvious. See MPEP Section 2142. Since the prior art reference does not teach or suggest all of the claim limitations, as now presented, it is respectfully submitted that a prima facia case of obviousness has not been made out by the examiner. Consequently, it is respectfully requested that this basis of rejection be reversed.

VIIE - ARGUMENTS

REJECTIONS OTHER THAN 35 U.S.C. § 102, 103 AND 112 (37 C.F.R. § 1.192(c)(8)(v))

NOT APPLICABLE

VIIF - RESPONSE TO EXAMINER'S ARGUMENTS

AND

OTHER MATERIAL THAT APPELLANT CONSIDERS NECESSARY OR DESIRABLE

Finally, at item 5 of the Office Action, the Examiner responded to various arguments presented in Paper No. 16, dated April 24, 2002. In essence the examiner's arguments recite cases in support of the long standing position of the Patent Office that a product-by-process claim is not limited by the process terms. In other words, it seems that the applicant obtains no benefit from recitation of such limitations before the Patent Office. Yet, before the Federal Circuit, any process terms serve as limitations in determining infringement. See Atlantic Theromplastics Co. v. Faytex Corp., 970 F.2d834, 846-47, 23 U.S.P.Q.2d 1481, 1491 (Fed.Cir. 1992) which refused to follow the holding in Scripps Clinic & Research v. Gennentech, Inc., 927 F.2d 1565, 1583, 18 U.S.P.Q.2d 1001, 1016 (Fed. Cir. 1991).

Thus, the pertinent question becomes, if process limitations serve as express limitations, or serve as file history estoppel at time of any accused infringement, why are such limitations not pertinent at time of patentability? In other words, in this era of file history estoppel, why is the jurisprudence of In re Thorpe, 777 Fed. 2d 695, 697, 227 USPQ 964, 966 (Fed. Cir. 1985) still the appropriate standard for patentability? In re Thorpe held that the "patentability of a product does not depend on its method of production... If the product in a product-by-process claims is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art was made by a different process." For many reasons, in some circumstances, the time has come to provide an alternate standard of patentability.

In the instant case, a purified water made by the claimed process and a purified water made by alternate processes can be differentiated by extensive chemical analysis. Purified waters made by the claimed process, and purified waters made by prior art processes, may share important chemical or physical properties. Yet, purified waters made by the claimed process, and purified waters made by prior art processes, are normally materially different in one or more constituents, particularly before prior art processes are combined to effect further purification. For example, the cited Tao et al process (US Patent No. 5,250,185) removes much, but not all of the hardness in the feedwater, yet leaves substantial amounts of alkalinity in the treated water. Thus, the product of that process is materially different from the instant invention. The Bhave et al process is a particle filtration process, and thus by itself does not remove either hardness or alkalinity. Thus, the product of the Bhave is materially different from the instant invention. Collentro et al, in either the US Patent No. 5,670,053 or No. 5,766,479, does not teach the process of removal of divalent cations before feed to the first unit of membrane separation equipment, thus hardness in the feedwater is introduced to a first unit of membrane separation equipment. Consequently, the product of the first unit of membrane separation equipment in either Collentro patent is materially different from the instant invention. And, Collentro's '053 patent further teaches that the second permeate contains low levels of carbon dioxide; consequently the product of Collentro is inherently materially different than the product of the instant invention, as claimed. Further, Abe et al, U.S. Patent No. 5,573,662, does not teach removal of hardness, or alkalinity, or carbon dioxide, but simply teaches removal of TOC when starting with a used ultrapure water stream which

has been slightly contaminated with TOC. However, Abe et al teaches rejection of TOC only to 90% (see claim 3) or to 93.6% (see the table in Col. 7). It does not teach or suggest 99% removal, as, for example, is set forth in claim 43 of the instant invention. Thus, the product of Abe et al is materially different than the product of the instant invention, as claimed.

However, even when prior art processes are combined, whether in the combinations suggested by the examiner or otherwise, one important characteristic difference has been revealed by the practice of the invention to date in the commercial marketplace: specifically, it is cheaper to produce a desired purified water by the process according to the claims set forth herein, than to produce a purified water with somewhat similar important chemical or physical characteristics by a prior art process, or a combination of such prior art processes. Thus, competitors of the inventor's licensees have sought to copy his process, or to license the process for specific market segments not otherwise licensed.

For the inventor, in order to claim the economically purified water, and to differentiate the same from the product of any particular prior art process, the task becomes virtually impossible. How can a specific, economically purified water product be claimed in each instance, in view of constantly changing feedwater characteristics, when limited to setting forth analysis and specification of chemical composition and physical properties for a specific result given a specific starting feedwater?

While it is logical for the Patent Office to refuse to grant product-by-process claims to a composition of matter when the process claims have not been found patentable unless the product is clearly novel and non-obvious, the

same cannot be said in the instance, as is the case here, where the process claims have already been separately found patentable. Here, the process limitations included in the claims of the instant invention already appear in the applicant's U.S. Patent No. 5,925,255, issued July 20, 1999 (filed August 12, 1997, claiming priority from prior application Serial No. 08/695,615, filed August 12, 1996, and converted to Provisional Patent Application No. 60/036,682) from which the instant application is a divisional application, and in related application U.S. Serial No. 6,537,456, issued March 25, 2003.

Times have changed in the water business. It is time that patent law change to provide adequate protection to inventors of new, economic processes. Significantly, one of the most important recent trends, both in industrial and municipal water treatment plants, has been the growing acceptance of, and indeed, requirement for, the outsourcing of the water treatment plant function. Endusers now have water treatment equipment suppliers (or third parties) build, own, and operate a water treatment plant. Thus, the owner and operator of the plant may infringe a process patent claim, but, the end user, such as a semi-conductor fabrication plant, receives the economic benefit of the water product produced in the plant, even though it is more likely than not a proper defendant in a patent infringement action based on a process claim, since they simply buy the product. In various cases, the owner of the plant is a special purpose legal entity, without significant assets, and thus is of limited ability to pay any judgment in a patent infringement situation. Should the water production activity cross national borders, such as a water plant in Canada (e.g., Abbotsford, B.C.) making a water by a process which is patented in the US, then adequate law exists, so that the user of the purified water product in the US (e.g,

a semi-conductor plant in Sumas, Washington State) can be accused of infringement under 35 U.S.C. Section 271(g). However, when both the water processing plant and the user of the water that was made in the plant is on the US side of the border, the inventor is currently without an adequate tool to stop such infringement as against the end user.

This anomalous result has been perpetuated by the Patent Office's refusal to consider situations, such as in the instant invention, where it is difficult to claim every end product of the process, yet where the proof problem, i.e, who is using the process, is relatively easy. In a situation such as this, where the process is otherwise patented, claims directed to a composition of matter made by such process should be allowed.

X. APPENDIX OF CLAIMS
(37 C.F.R. § 1.192(c)(9))

THE PENDING CLAIMS ARE SET FORTH IN APPENDIX A

SUMMARY

For the foregoing reasons, it is submitted that the Examiner's rejections of claims 37-62 were erroneous, and reversal of her decision is respectfully requested.

Signed at Kent, County of King, Statement of Washington, this 10th day of July, 2003.

DEBASISH MUKHOPADHYAY

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APPENDIX A - CLAIMS
(37 C.F.R. § 1.192(c)(9))

The text of claims involved in the Appeal are as follows:

37. A composition of water and dissolved solutes, said composition produced by a process of treatment of a feedwater stream in membrane separation equipment, wherein said membrane separation equipment comprises at least one unit having a membrane separator, and wherein said process of treatment produces a low solute containing product water stream and a high solute containing reject stream, wherein said process comprises:

(a) providing a feedwater stream containing solutes therein, said solutes comprising

(i) hardness,

(ii) alkalinity, and

(iii) at least one molecular species which is sparingly ionized when in neutral or near neutral pH aqueous solution;

(b) concentrating said feedwater stream in a first unit of said membrane separation equipment after reducing the tendency of said feedwater to form scale when said feedwater is concentrated to a preselected concentration factor at a selected pH, by effecting, in any order, two or more of the following:

(i) removing hardness from said feedwater stream;

(ii) removing substantially all alkalinity associated with hardness from said feedwater stream;

(iii) removing dissolved gas from said feedwater stream, whether initially present or created during said hardness or said alkalinity removal step;

(c) raising the pH of the product from step (a) to a selected pH of at least about 8.5, to urge said at least one molecular species which is sparingly ionized when in neutral or near neutral pH aqueous solution toward increased ionization;

(d) passing the product from step (c) above through said membrane separation equipment, said membrane separation equipment substantially resisting passage of dissolved species therethrough, said membrane rejecting said at least one molecular species which is sparingly ionized when in neutral or near neutral pH aqueous solution by at least 95% while concentrating said feedwater to said preselected concentration factor, to produce

(i) a high solute containing reject stream, and

(ii) a low solute containing water product stream.

38. A composition of water and dissolved solutes, said composition produced by a process of treatment of a

feedwater stream in membrane separation equipment, wherein said membrane separation equipment comprises at least one unit having a membrane separator, and wherein said process of treatment produces a low solute containing product water stream and a high solute containing reject stream, wherein said process comprises:

(a) providing a feedwater stream containing solutes therein, said solutes comprising

(i) hardness,

(ii) alkalinity, and

(iii) at least one molecular species which is sparingly ionized when in neutral or near neutral pH aqueous solution;

(b) concentrating said feedwater stream in a first unit of said membrane separation equipment after reducing the tendency of said feedwater to form scale when said feedwater is concentrated to a preselected concentration factor at a selected pH, by effecting, in any order, two or more of the following:

(i) removing hardness from said feedwater stream;

(ii) removing substantially all non-hydroxide alkalinity associated with hardness from said feedwater stream;

(iii) removing dissolved gas from said feedwater stream, whether initially present or created

during said hardness or said alkalinity removal step;

(c) raising the pH of the product from step (a) to a selected pH of at least about 8.5, to urge said at least one molecular species which is sparingly ionized when in neutral or near neutral pH aqueous solution toward increased ionization;

(d) passing the product from step (c) above through said membrane separation equipment, said membrane separation equipment substantially resisting passage of dissolved species therethrough, to concentrate said feedwater to said preselected concentration factor, to produce

(i) a high solute containing reject stream, and

(ii) a low solute containing product water stream.

39. A composition of water and dissolved solutes, said composition produced according to the process of claim 37, wherein said feedwater stream comprises at least some Total Organic Carbon, and wherein said product water stream comprises at least some Total Organic Carbon, and wherein said Total Organic Carbon in said product water product stream is less than one percent of the Total Organic Carbon in said feedwater stream.

40. A composition of water and dissolved solutes, said composition produced according to the process of claim 39, wherein the Total Organic Carbon in said product water stream is less than 0.4% of the Total Organic Carbon in said feedwater stream.

41. A composition of water and dissolved solutes, said composition produced according to the process of claim 39, wherein the Total Organic Carbon in said product water stream is less than 0.34% of the Total Organic Carbon in said feedwater stream.

42. A composition of water and dissolved solutes, said composition produced according to the process of claim 37, wherein

(a) said feedwater stream further comprises boron, and wherein said product water stream is characterized by having a boron content of less than about two percent (2%) of the boron content of said feedwater stream; and

(b) said feedwater stream comprises at least some Total Organic Carbon, and wherein said product water stream comprises at least some Total Organic Carbon, and wherein said Total Organic Carbon in said product water product stream is less than one percent of the Total Organic Carbon in said feedwater stream.

43. A composition of water and dissolved solutes, said composition produced according to the process of claim 37, wherein

(a) said feedwater stream further comprises boron, and wherein said product water stream is characterized by having a boron content of about one and one-half percent (1.5%), or less, of the boron content of said feedwater stream; and

(b) said feedwater stream comprises at least some Total Organic Carbon, and wherein said product water stream comprises at least some Total Organic Carbon, and wherein said Total Organic Carbon in said product water product stream is less than one percent of the Total Organic Carbon in said feedwater stream.

44. A composition of water and dissolved solutes, said water produced according to the process of claim 37, wherein

(a) said feedwater stream further comprises boron, and wherein said product water stream is characterized by having a boron content of about one percent (1%), or less, of the boron content of said feedwater stream; and

(b) said feedwater stream comprises at least some Total Organic Carbon, and wherein said product water stream comprises at least some Total Organic Carbon, and wherein said Total Organic Carbon in said product water product

stream is less than one percent of the Total Organic Carbon in said feedwater stream.

45. A composition of water and dissolved solutes, said composition produced according to the process of claim 42, wherein said Total Organic Carbon in said product water stream is less than 0.4% of the Total Organic Carbon in said feedwater stream.

46. A composition of water and dissolved solutes, said composition produced according to the process of claim 43, wherein said Total Organic Carbon in said product water stream is less than 0.4% of the Total Organic Carbon in said feedwater stream.

47. A composition of water and dissolved solutes, said composition produced according to the process of claim 44, wherein said Total Organic Carbon in said product water stream is less than 0.4% of the Total Organic Carbon in said feedwater stream.

48. A composition of water and dissolved solutes, said composition produced according to the process of claim 42, wherein said Total Organic Carbon in said product water

stream is less than 0.34% of the Total Organic Carbon in said feedwater stream.

49. A composition of water and dissolved solutes, said composition produced according to the process of claim 43, wherein said Total Organic Carbon in said product water stream is less than 0.34% of the Total Organic Carbon in said feedwater stream.

50. A composition of water and dissolved solutes, said composition produced according to the process of claim 44, wherein said Total Organic Carbon in said product water stream is less than 0.34% of the Total Organic Carbon in said feedwater stream.

51. A composition of water and dissolved solutes, said composition produced according to the process of claim 37, wherein said feedwater stream further comprises silica, and wherein said product water stream is characterized by having a silica content of less than about 0.05% of the silica content of said feedwater stream.

52. A composition of water and dissolved solutes, said composition produced according to the process of claim 42, wherein said feedwater stream further comprises silica, and

wherein said product water stream is characterized by having a silica content of less than about 0.05% of the silica content of said feedwater stream.

53. A composition of water and dissolved solutes, said composition produced according to the process of claim 43, wherein said feedwater stream further comprises silica, and wherein said product water stream is characterized by having a silica content of less than about 0.05% of the silica content of said feedwater stream.

54. A composition of water and dissolved solutes, said composition produced according to the process of claim 44, wherein said feedwater stream further comprises silica, and wherein said product water stream is characterized by having a silica content of less than about 0.05% of the silica content of said feedwater stream.

55. A composition of water and dissolved solutes, said composition produced according to the process of claim 37, wherein said feedwater stream further comprises bacteria, and wherein said product water stream is characterized by having essentially zero bacteria content.

56. A composition of water and dissolved solutes, said composition produced according to the process of claim 42, wherein said feedwater stream further comprises bacteria, and wherein said product water stream is characterized by having essentially zero bacteria content.

57. A composition of water and dissolved solutes, said composition produced according to the process of claim 43, wherein said feedwater stream further comprises bacteria, and wherein said product water stream is characterized by having essentially zero bacteria content.

58. A composition of water and dissolved solutes, said composition produced according to the process of claim 44, wherein said feedwater stream further comprises bacteria, and wherein said product water stream is characterized by having essentially zero bacteria content.

59. A composition of water and dissolved solutes, said composition produced according to the process of claim 37, wherein said feedwater stream further comprises live viruses, and wherein said product water stream is characterized by having essentially zero live viruses therein.

60. A composition of water and dissolved solutes, said composition produced according to the process of claim 42, wherein said feedwater stream further comprises live viruses, and wherein said product water stream is characterized by having essentially zero live viruses therein.

61. A composition of water and dissolved solutes, said composition produced according to the process of claim 43, wherein said feedwater stream further comprises live viruses, and wherein said product water stream is characterized by having essentially zero live viruses therein.

62. A composition of water and dissolved solutes, said composition produced according to the process of claim 44, wherein said feedwater stream further comprises live viruses, and wherein said product water stream is characterized by having essentially zero live viruses therein.